SEDGWICK COUNTY, KANSAS

REGIONAL FORENSIC SCIENCE CENTER

Mary H. Dudley, M.D. – District Coroner-Medical Examiner
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FORENSIC SCIENCE LABORATORIES
2002 ANNUAL REPORT

HISTORY

The Regional Forensic Science Center officially opened on December 21st, 1995. The Center houses the Office of the District Coroner and the Forensic Science Laboratories [FSL]. The Forensic Science Laboratories are composed of three major sections: Criminalistics, Forensic Biology/DNA and Forensic Toxicology. The staff currently consists of 16 scientific and support personnel.

The FSL is staffed with highly trained and experienced forensic scientists, many who have advanced scientific degrees [MS, MSFS, Ph.D.]. The technical staff has well over a century's worth of combined professional experience.

In April of 1996, the Forensic Science Laboratories began accepting cases for firearms examination. Three months later, the Biology Section provided forensic examinations for the identification of biological fluids. After mandatory accreditation by the State of Kansas, the Toxicology Laboratory began producing comprehensive examinations in post-mortem toxicology to support the District Coroner in September of 1996. This was followed by the FSL providing forensic drug identification for local and regional law enforcement agencies. In November of 1996, arson/fire debris analysis was added to the Criminalistics Section. In January of 1997, The center opened the first STR DNA Laboratory in the State of Kansas. The Trace unit was expanded in 1998 to provide forensic analysis of paint and fibers.

The FSL of the Center continues to grow providing timely and comprehensive forensic science services to local and regional law enforcement.

LABORATORY LEADERSHIP

The laboratory management staff are all case-working scientists.

Director and Chief Toxicologist
Timothy P. Rohrig, Ph.D., DABFT

Chief of Criminalistics
Gary L. Miller

Forensic Biology/DNA Manager
Shelly A. Steadman, M.S.

Toxicology Lab Supervisor
Connie L. Huber

SIGNIFICANT ACHIEVEMENTS

- 1 Jan 02 the Wichita Police Department's Criminalistics Laboratory [Drug ID / Serology] was merged with the Center.
- The Biology section validated new state-of-the-art DNA technology – PowerPlex 16, BIO.
- The laboratory presented 6 technical papers at various professional meetings:
  - The Identification of Capsaicinoids in Pepper Spray Residues
  - Interpretation of Postmortem Toxicology: Pitfalls to Avoid
  - Oxycodone – An ELISA Method Validation
  - Sonication Removal of Cellular Material from Nail Clippings and DNA Typing of Separated Components
  - Quantification Issues in Forensic DNA Analyses
  - Forensic DNA Case Studies
- The staff of the Toxicology Section submitted the winning 2002 Sedgwick County Employee Safety Slogan: "Safety Begins With You in 2002".
- Received funding from the 2002 Law Enforcement Block Grant for technological enhancement of the Laboratories.

FORENSIC SCIENCE LABORATORIES SERVICE OVERVIEW

Case Submissions

Figure 1 illustrates the number of forensic laboratory cases submitted for examination .

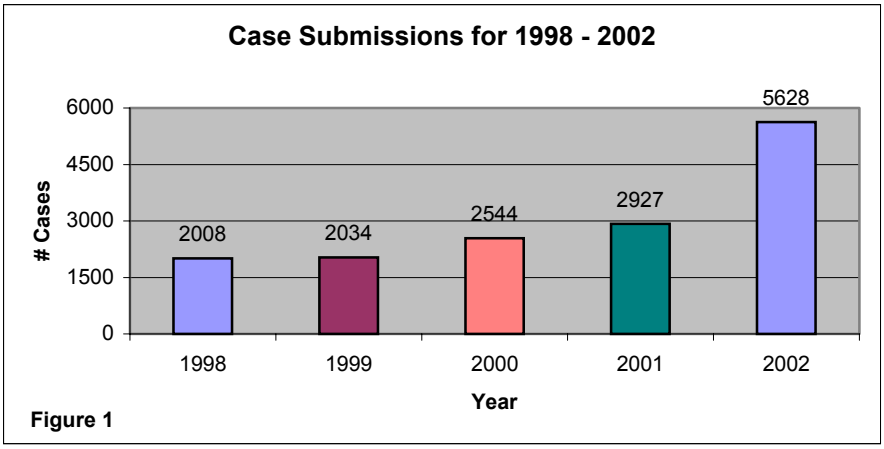


Figure 1

The FSL has experienced a significant growth in the number of cases submitted [Figure 1].

2002 Case Type Submissions

The Criminalistics section receives the majority of evidence submitted.

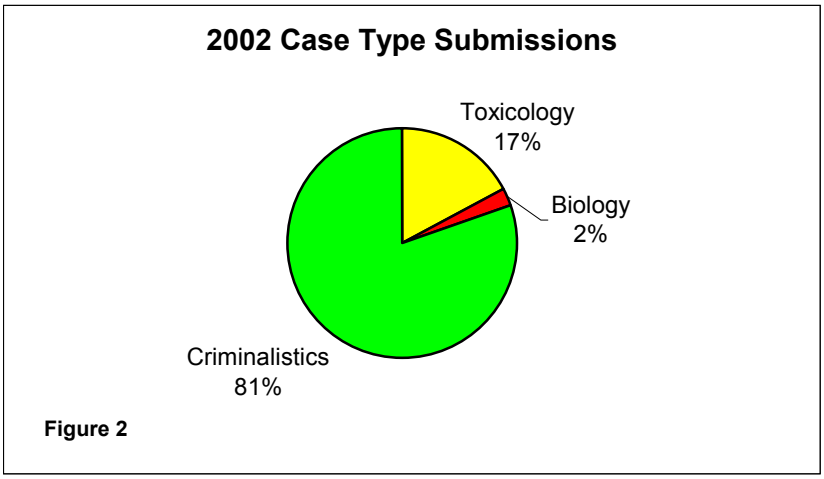


Figure 2

Requests For Expert Testimony

The professional staff is frequently called upon to present expert testimony in the courts. As illustrated in Figure 3, this year the FSL received 2847 subpoenas for court appearances, a 58% increase over the last year.

Figure 3

AGENCIES SERVED

The Forensic Science Laboratories provides expert testing services and consultation for a variety of law enforcement agencies within and outside of Sedgwick County. In 2002 the FSL provided expert testing services to over 80 Law Enforcement Agencies. Figure 3 indicates [yellow highlight] the counties within the state in which forensic laboratory services were provided. Figure 4 illustrates the In-County (IC) and Out-of-County (OC) breakdown. Table 1 is a list of agencies served in 2002.

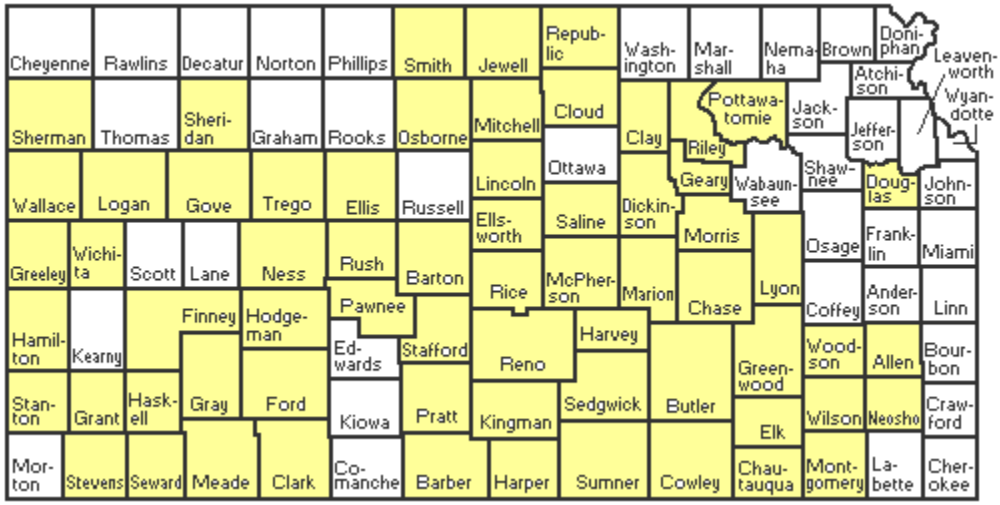


Figure 4

Sedgwick County vs. Out-of-County Cases

The vast majority of forensic laboratory services were provided for Sedgwick County Law Enforcement agencies. A significant portion of the out-of-county cases were in support of the Coroner's out-of-county autopsies. The decrease in the percentage of out-of-county work is due to an overall increase in casework submissions by local [Sedgwick County] law enforcement.

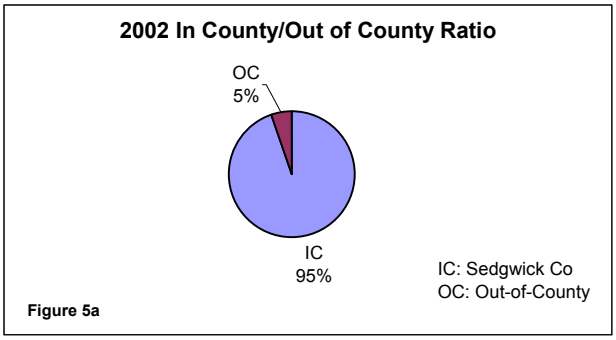


Figure 5a

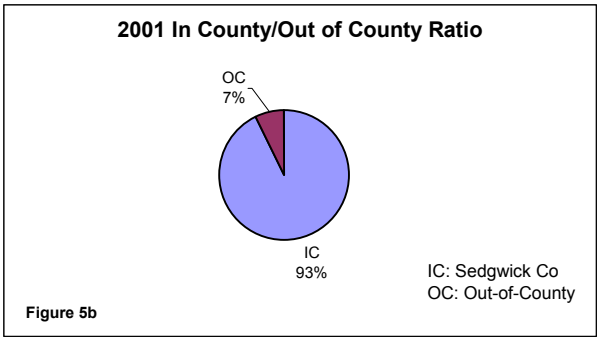


Figure 5b

Agencies Served (Table 1)

Alcoholic Beverage Control Unit	Garden Plain PD	Park City PD
Andover PD	Goddard PD	Peabody PD
Arkansas City FD	Grandview Plaza PD	Sedgwick Co. FD
Arkansas City PD	Haysville PD	Sedgwick Co. Sheriff
ATF Task Force	Kansas Bureau of Investigation	US Air Force Legal Agency
Augusta Dept. of Safety	Kansas Highway Patrol	US Marshall Service
Bel Aire PD	Kechi PD	US Postal Inspections
Butler Co. Sheriff	Kingman Co. Sheriff	USD 265 PD
Cheney PD	KS Dept. of Corrections	USD 266 PD
Clearwater PD	KS Racing & Gaming Commission	Valley Center PD
Derby PD	KS State Fire Marshall	Wallace Co. Sheriff
Douglas Co. FD & Medical	Maize PD	Wichita FD
Eastborough PD	McConnell AFB	Wichita PD
El Dorado Correctional Facility	Mulvane PD	Wichita State University PD
El Dorado FD	Newton FD	Winfield FD
Emporia FD	Newton PD	

CRIMINALISTICS SECTION

Figure 6 illustrates the increase number of forensic cases submitted to the section. The Criminalistics Section accounts for the majority of casework submitted to the Forensic Laboratories.

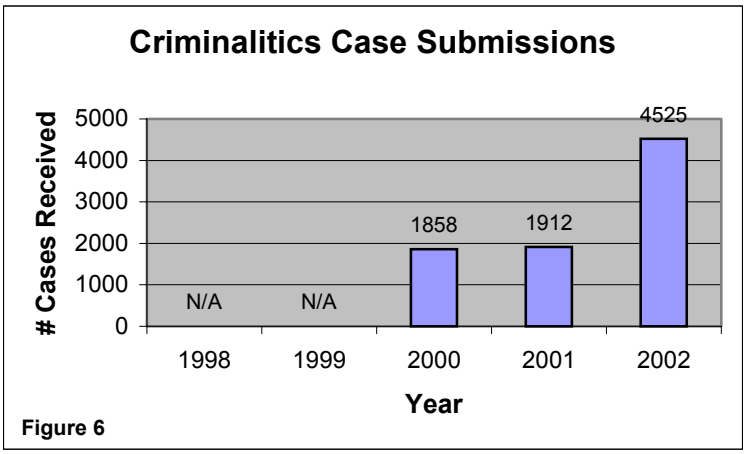


Figure 6

The Criminalistics section provides forensic examinations in the following disciplines; Drug Identification, Open Container [Beverage Alcohol] Analysis, Firearms & Toolmarks, Serial Number [Firearms] Restoration and Trace Evidence – including subdisciplines of Ignitable Liquids [Arson], and Fiber and Paint Analysis. The section also provides Physical Match Analyses. Figure 7 illustrates the breakdown of Criminalistics cases by case type.

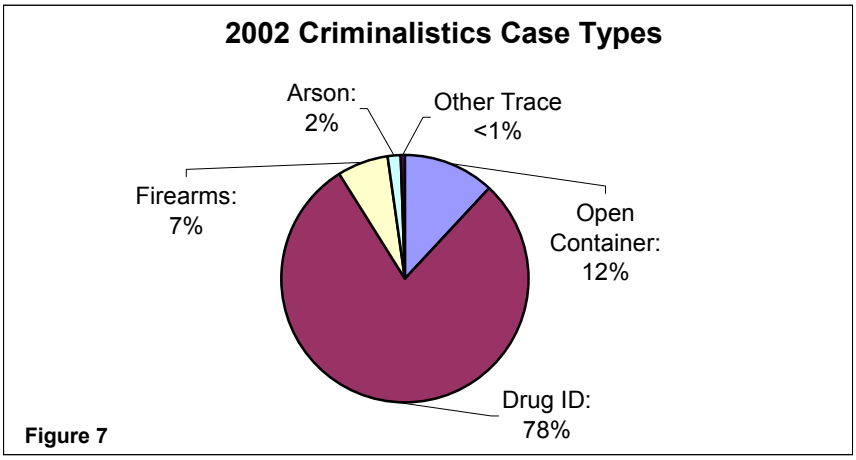


Figure 7

The majority of casework [Fig 7] in the Criminalistics section is illicit drug identification, accounting for almost 80% of the case load. Open Containers [beverage alcohol] is the second most abundant case type, accounting for slightly more than 10% of the cases submitted for analysis to the section.

Drug ID Unit

The majority of drug exhibits are marihuana (50%). Cocaine and methamphetamine account for 34% of the total exhibits examined. The number of other controlled substances exceed that of methamphetamine submissions. Figure 8 illustrates the number of exhibits in which various types of drugs were positively identified.

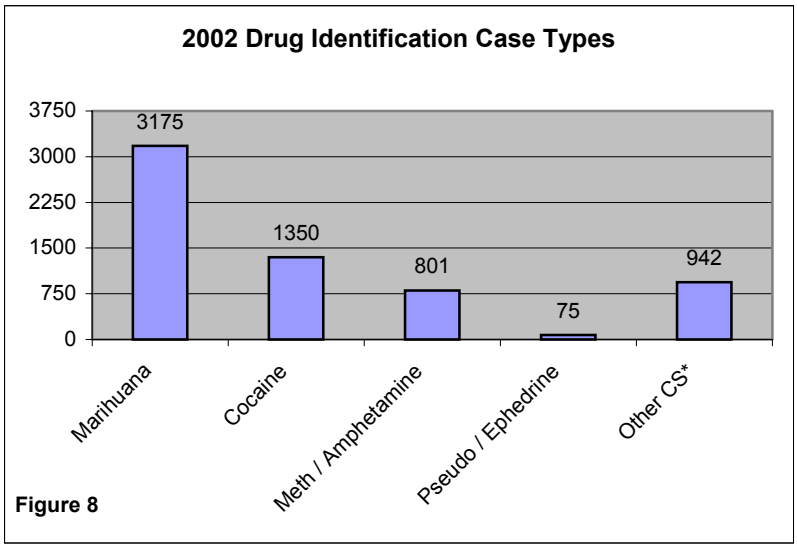


Figure 8

*CS: Controlled Substances

Open Containers

Open Container/Beverage Alcohol Analysis [Figure 9] are conducted in support of the state DUI laws and prohibition of minors to possess alcohol.

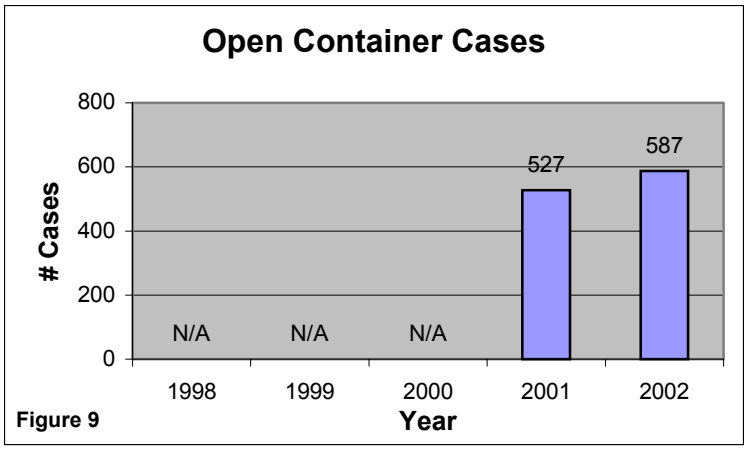


Figure 9

Firearms/Toolmarks Unit

The Firearms/Toolmarks Unit conducts many types of forensic examinations. The majority of examinations involve operability (function) tests on the submitted firearms. Figure 10 illustrates the case types submitted to the unit.

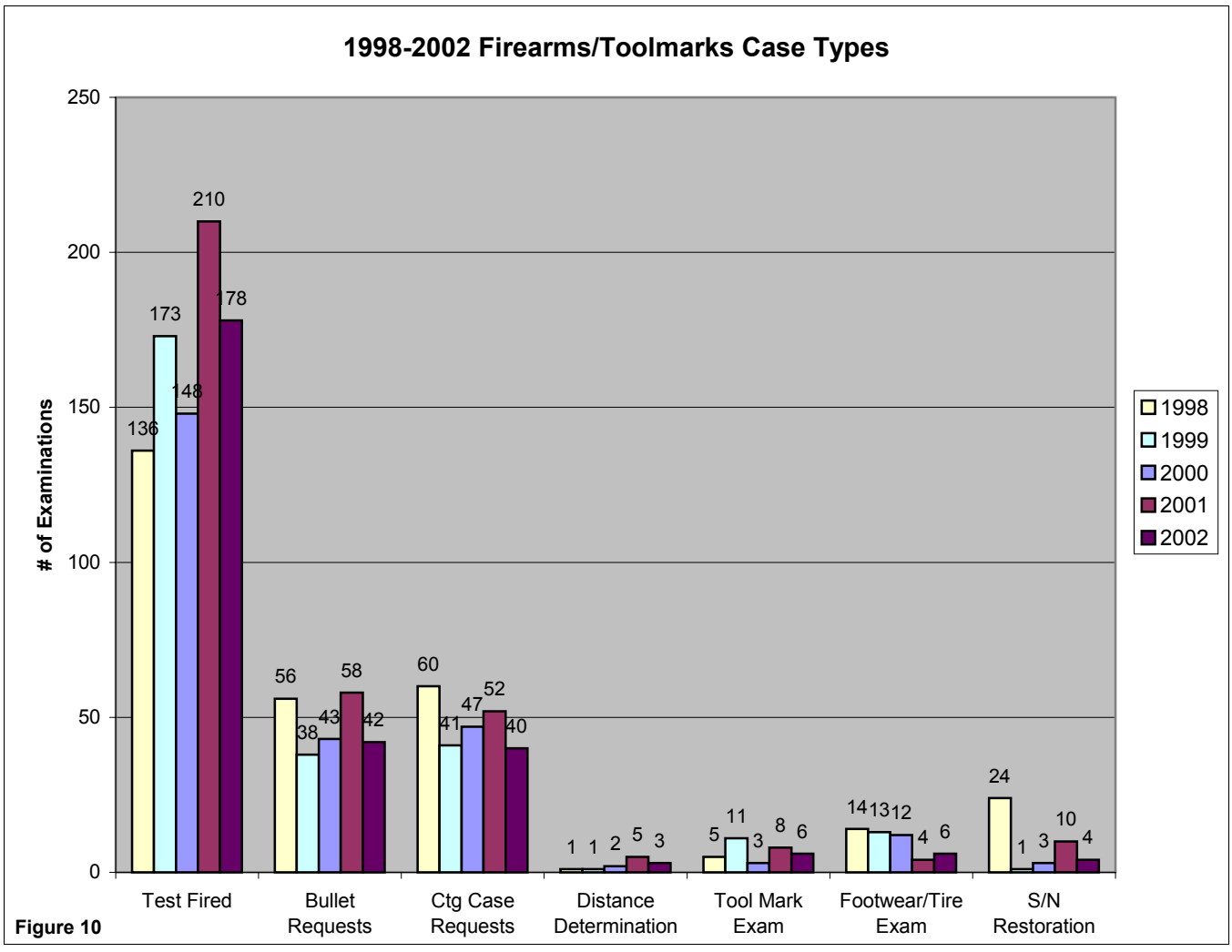


Figure 10

Trace Unit

In addition to assisting Arson investigations, the trace unit provides micro-/physical/chemical analyses for a variety of criminal case types.

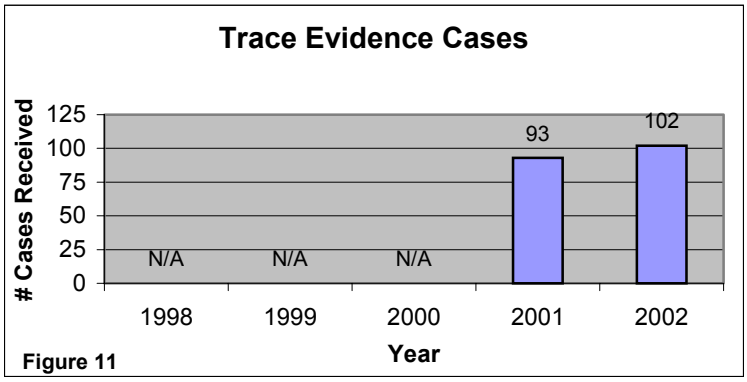


Figure 11

The majority of evidence submitted [Fig 12] to the Trace Unit is fire debris evidence. The unit has seen a steady increase in the utilization of this forensic service. The examiner in the Trace Evidence Unit is a member of the South-Central Kansas Arson Task Force. Trace Analysis is the forensic identification of unknown compounds in casework ranging from product tampering to assault and homicide. The trace analysis case type category also includes headlamp examination.

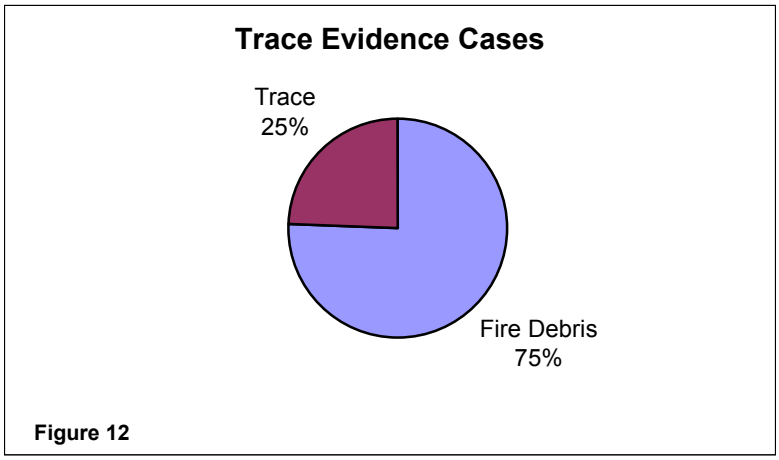
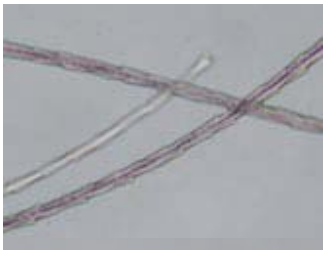


Figure 12



FORENSIC BIOLOGY/DNA SECTION

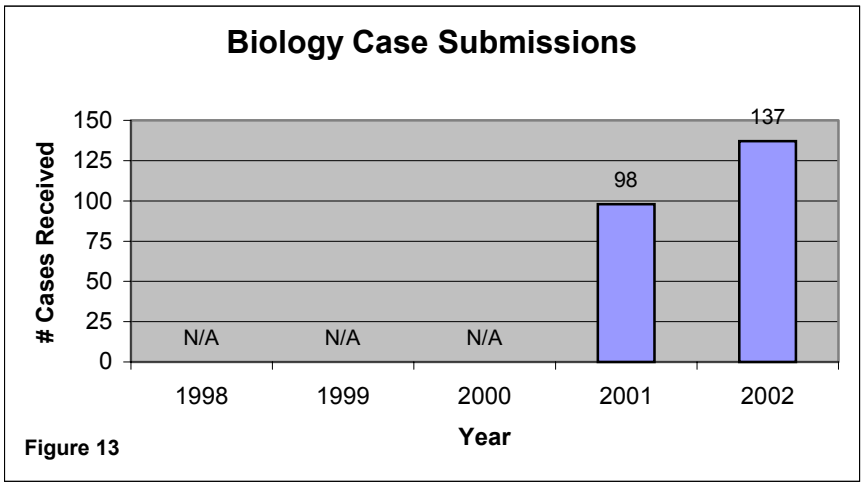
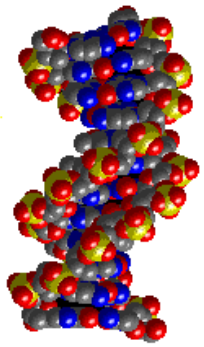


Figure 13



The biology section saw an approximately 40% increase in case submissions over last year.

The Forensic Biology Section provides forensic examination in the identification of body fluids and STR DNA analysis. As depicted by Figure 14, the majority of cases submitted for biological examination are violent in nature, with over 50% of submittals being classified as either homicide or sexual assaults. The section continues to work all case types, including other sex crimes (indecent liberties, incest, etc.), property crimes, weapon violations, assaults, and forensic identifications [unidentified bodies].

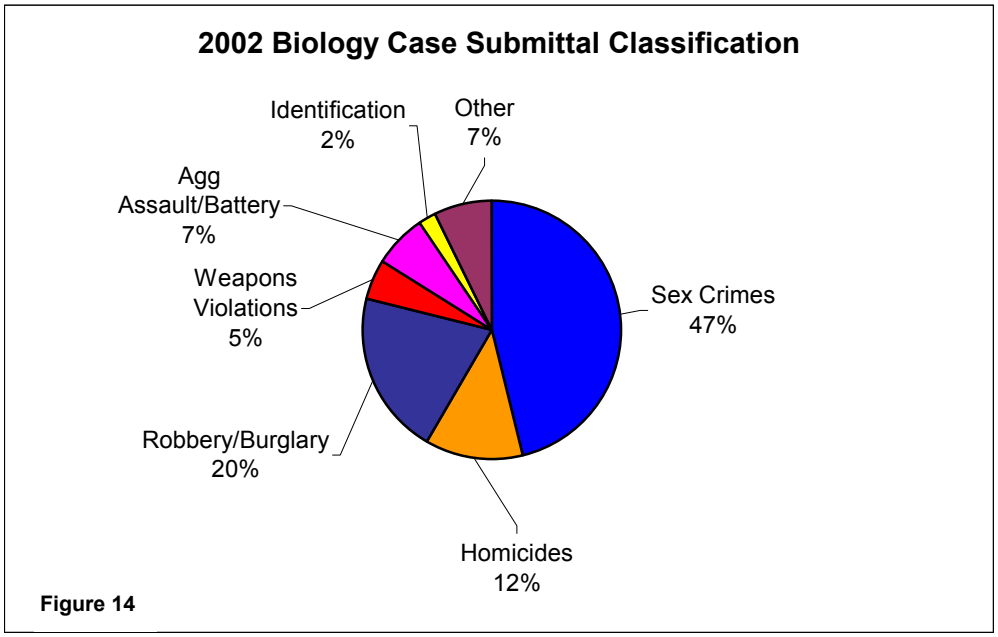


Figure 14

Combined DNA Index System (CODIS)

The FBI Laboratory's Combined DNA Index System (CODIS) blends forensic science and computer technology into an effective tool for solving violent crimes. CODIS enables federal, state, and local crime labs to exchange and compare DNA profiles electronically, thereby linking crimes to each other and to convicted offenders.

CODIS began as a pilot project in 1990 serving 14 state and local laboratories. The DNA Identification Act of 1994 (Public Law 103 322) formalized the FBI's authority to establish a national DNA index for law enforcement purposes. In October 1998, the FBI's National DNA Index System (NDIS) became operational. CODIS is implemented as a distributed database with three hierarchical levels (or tiers) – local, state, and national. NDIS is the highest level in the CODIS hierarchy, and enables the laboratories participating in the CODIS Program to exchange and compare DNA profiles on a national level. All DNA profiles originate at the local level (LDIS), then flow to the state (SDIS) and national levels. SDIS allows laboratories within states to exchange DNA profiles. The tiered approach allows state and local agencies to operate their databases according to their specific legislative or legal requirements.

The FSL of the Center is one of the five CODIS laboratories in the state of Kansas.

The success of the CODIS program is measured by the crimes it helps solve. CODIS's primary metric, the "Investigations Aided" is defined as a case that CODIS assisted through a hit (a match produced by CODIS that would not otherwise have been developed).

In 2002, there were 30 profiles entered into the database. Of those entered, 1 hit was made at SDIS [State DNA Indexing System] and 3 investigations were assisted.

FORENSIC TOXICOLOGY SECTION

The Toxicology section continues to see a steady increase in casework [Fig 15]. The Forensic Toxicology section provides comprehensive examination of post-mortem [autopsy] samples. Specimens collected during the investigation of driving while under the influence of drugs/ alcohol and drug-facilitated sexual assault are also examined by this section. The Forensic Toxicology Laboratory is accredited by the Kansas Department of Health & Environment.

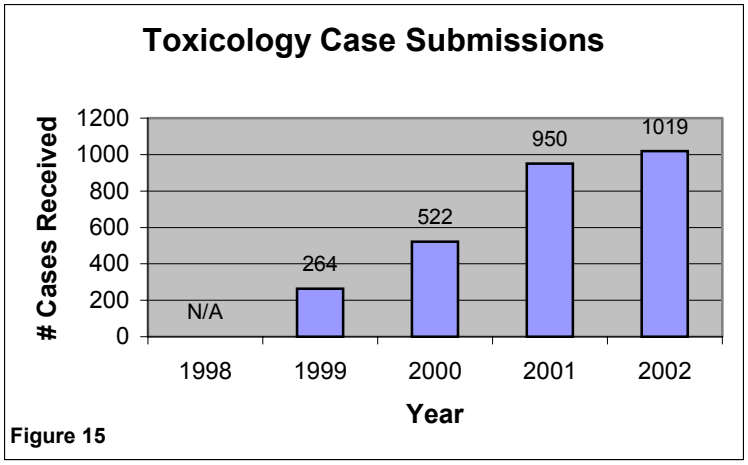


Figure 15

Figure 16 depicts the percentage of Toxicology cases submitted by case type.

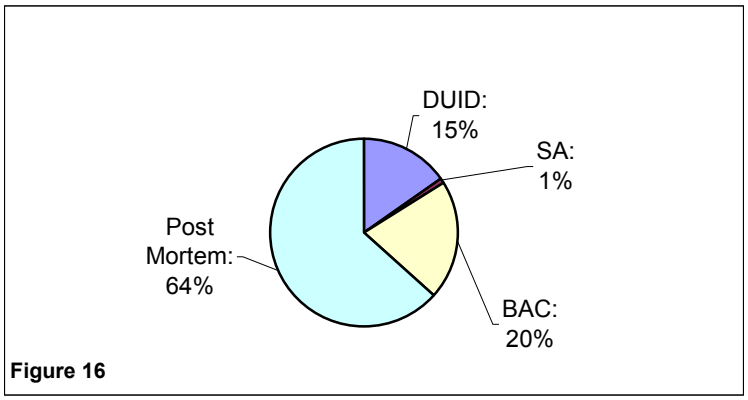


Figure 16

DUID: Driving-under-the-influence of drugs
BAC: Driving-under-the-influence of alcohol
SA: Drug-facilitated sexual assault

The Toxicology Laboratory has been able to maintain a reasonable turn around time for its post mortem cases as shown in Figure 17 and 18.

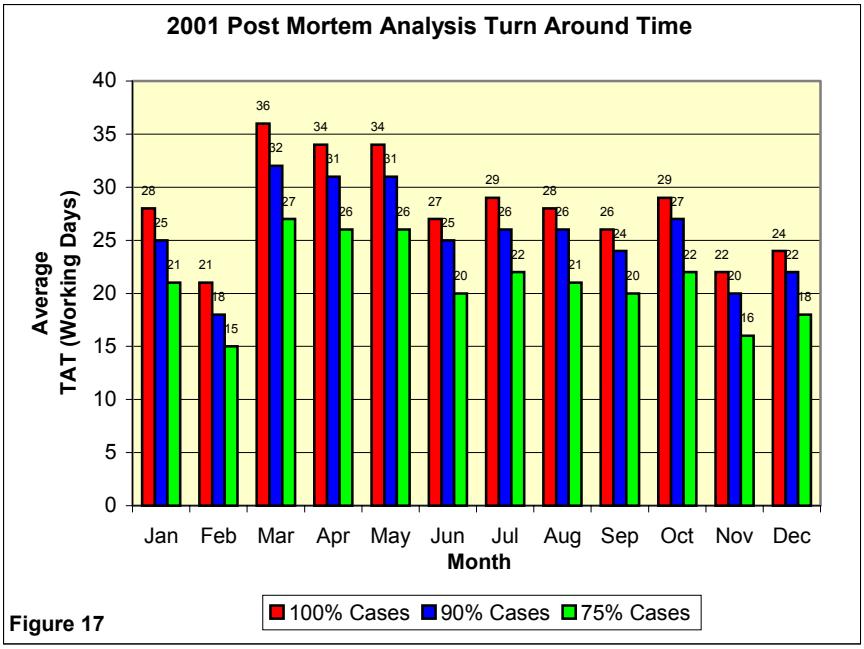


Figure 17

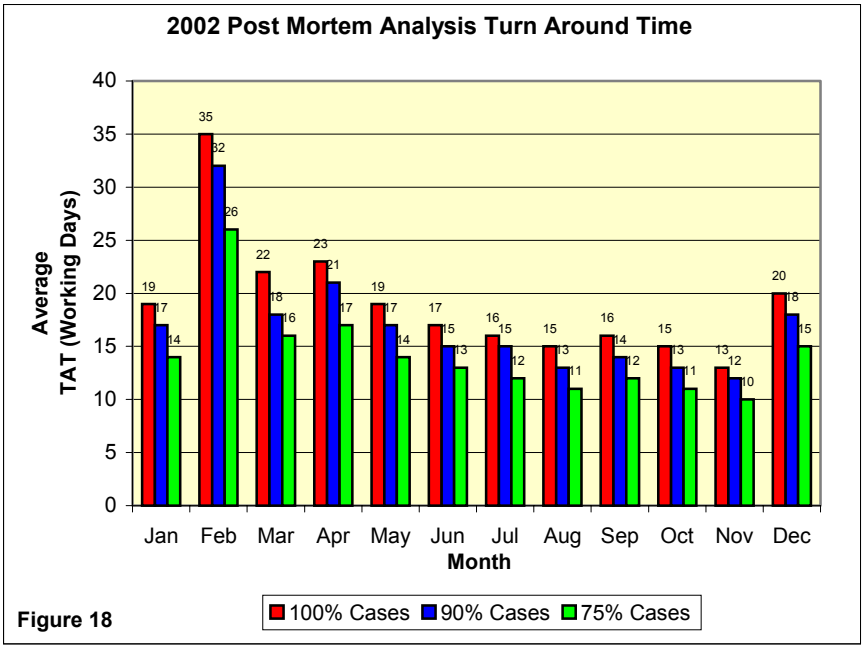


Figure 18

A new staff member was added to the Toxicology Section in Y2002. This addition has had a dramatic effect [improvement] on the turn-around-time for post mortem toxicology cases.

Alcohol continues to play a significant role in all of the FSL Tox case types [Figure 19]. In more than 25% of driving under the influence of alcohol, the driver was greater than 3 times the legal limit (0.08 gm%). Table 2 depicts the 25 most common drug findings in Toxicology cases [excluding ethyl alcohol].

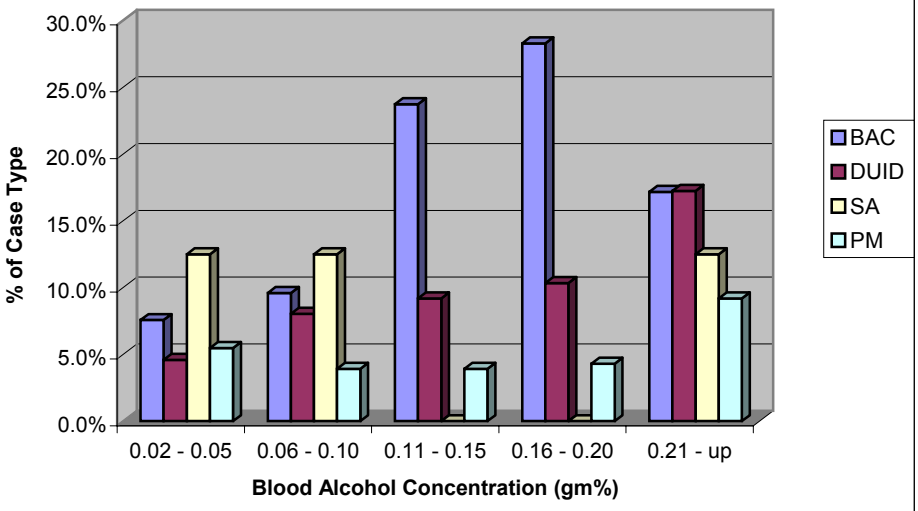


Figure 19

25 Most Commonly Found Drugs (Table 2)

Tetrahydrocannabinol (Marihuana)	Carisoprodol
Cocaine/Benzoylecgonine	Acetaminophen
Methamphetamine	Bupropion
Alprazolam	Butalbital
Hydrocodone	Chlorpheniramine
Heroin/Morphine	Phencyclidine
Methadone	Fluoxetine
Amitriptyline	Venlafaxine
Diazepam	Sertraline
Oxycodone	Tramadol
Citalopram	Zolpidem
Fentanyl	Propoxyphene
Mirtazapine	

The Toxicology Laboratory investigated 8 suspected Drug Facilitated Sexual Assaults.

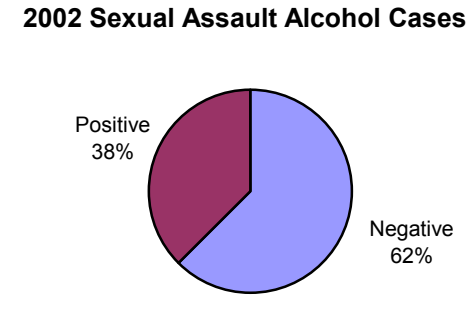


Figure 20

The most common drug found in Drug Facilitated Sexual Assault (DFSA) cases was alcohol. Figure 20 shows that alcohol was detected in 38% of the cases submitted.